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PATENT SPECIFICATION



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521,632

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Complete Specification Accepted: May 27, 1940.

PROVISIONAL SPECIFICATION

Cooling of Pistons for Fluid-pressure Engines

We, COVENTRY CLIMAX ENGINES LIMITED, a British Company, LAWRENCE HATHAWAY and ALEXANDER WILLIAM MOORE, both British Subjects, all of the Company's address, Friars Road, Coventry, Warwickshire, do hereby declare the nature of this invention to be as follows:—

This invention relates to fluid-pressure engines, and particularly internal-combustion engines such as have cylinders of a relatively-large bore—for example, of about four inches, our main object being to provide for the satisfactory cooling of the pistons thereof.

A piston, according to the invention, has a tortuous passage in the interior of its outer portion or crown, and means are provided for feeding lubricant under pressure therethrough for cooling purposes.

A preferred form of piston, according to the invention, includes a body in which the gudgeon-pin is mounted and a crown secured thereto and having a generally-spiral passage formed therein remote from the outer or operative face of the crown, whilst the connecting-rod, gudgeon-pin and body are arranged so that lubricant under pressure can be circulated through the generally-spiral passage for cooling purposes.

In one simple construction according to the invention, the body has a flat outer surface stepped at its outer periphery spigotally to receive the adjacent end of the crown, in which the piston-ring grooves are formed. The crown may be provided with four internal bosses carrying studs extending through the body on opposite sides of the gudgeon-pin to receive nuts on their lower end for secur-

ing the body to the crown. The bearing bush in the little end of the connecting-rod is peripherally grooved internally and lubricant under pressure is supplied thereto along a bore provided in the connecting-rod, or, if desired, along an external pipe secured to the connecting-rod and connecting with the groove by a passage through the little end. In addition, the gudgeon-pin has a transverse bore connecting at its ends with the peripheral groove in the bearing bush and with a passage through the body to the outer face thereof. For example, the gudgeon-pin may be a hollow one having its ends plugged.

The main portion of the inner part of the crown consists of a more or less spiral wall the outer convolution of which may be connected (between the bosses for the holding-down studs) by short walls with arcuate walls so that this portion is divided up into a passage of generally-spiral outline. The outer extremity thereof communicates with the passage in the body above-mentioned whilst the centre communicates with another passage in the body leading to the outside of the little end of the connecting-rod.

Thus, by this means the pressure of the lubrication system of the engine can be continuously applied for circulating lubricant through the spiral passage in the crown for the purpose of cooling the latter, the lubricant heated thereby returning to the sump.

Dated this 23rd day of November, 1938.
WALFORD & HARDMAN BROWN,
Chartered Patent Agents,
Roslyn Chambers,
47, Warwick Road, Coventry,
Warwickshire.

COMPLETE SPECIFICATION

Cooling of Pistons for Fluid-pressure Engines

We, COVENTRY CLIMAX ENGINES LIMITED, a British Company, LAWRENCE HATHAWAY and ALEXANDER WILLIAM MOORE, both British Subjects, all of the Company's address, Friars Road, Coventry, Warwickshire, do hereby declare the

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nature of this invention and in what 85 manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to fluid-pressure engines, and particularly internal-com- 90

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bustion engines such as have cylinders of a relatively-large bore—for example, of about four inches—of the kind of which a piston has a tortuous passage in the interior of its crown, means being provided for feeding lubricant under pressure therethrough for cooling purposes.

According to the invention the piston is built up of a main body portion and a crown portion, and the arrangement is such that the tortuous passage is completed by the securing-together of the two portions. In other words, separating the two portions will split the tortuous passage. In this way a very satisfactory form of passage can be provided, the casting thereof being a relatively simple matter.

A preferred form of piston, according to the invention, includes a main body portion and a separate crown portion secured thereto and having a generally-spiral wall formed therein remote from the operative face of the crown portion, a face of the main body portion contacting with the wall, when the portions are secured to one another, to provide a generally-spiral passage for the cooling lubricant.

In the accompanying drawings:—

Figure 1 is a sectional elevation through a piston, and connecting-rod, arranged according to the invention;

Figure 2 is a cross-section taken on the line II—II of Figure 1; and

Figure 3 is a sectional elevation of the piston taken on the lines III—III of Figures 1 and 2.

In the construction illustrated the body 11 has a flat outer surface 12 and is stepped at 13 at its outer periphery spigotally to receive the adjacent flange 14 of the crown, in which the piston-ring grooves 15 are formed. The crown in this instance is shown as being screwed on to the body, though it could be provided with four internal bosses carrying studs extending through the body on opposite sides of the gudgeon-pin 16 to receive nuts on their lower ends for securing the body to the crown. The bearing bush 17 in the little end of the connecting-rod 18 is peripherally grooved internally and lubricant under pressure is supplied thereto along a bore 19 provided in the connecting-rod, or, if desired, along an external pipe secured to the connecting-rod and connecting with the groove by a passage through the little end. In addition, the gudgeon-pin has a bore 21 connecting at its centre with the peripheral groove in the bearing bush and at its ends with passages 22 through the body of the piston to the flat outer face thereof. For example, the gudgeon-pin

may be a hollow one having its ends plugged as shown.

The main portion of the inner part of the crown consists of a continuous, more or less spiral, wall 23, and the oil flow from the body passages 22 is, as shown in the drawings, along the spiral passage towards the centre of the crown where the spiral passage communicates with a passage 24 in the body leading to the outside of the little end of the connecting-rod.

The lower of the piston-ring grooves is provided with oil escape holes 25, and at one or more places there is a grub screw 26 for locking the crown to the body.

Thus, by this means the pressure of the lubrication system of the engine can be continuously applied for circulating lubricant through the spiral passage in the crown for the purpose of cooling the latter, the lubricant heated thereby returning to the sump.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. For a fluid-pressure engine, a piston having a tortuous passage in the interior of its crown, whereby lubricant can be fed under pressure therethrough for cooling purposes, the piston being built up of a main body portion and a crown portion and having the tortuous passage completed by the securing together of the two portions.

2. For a fluid-pressure engine, a piston including a main body portion and a separate crown portion secured thereto and having a generally-spiral wall formed therein remote from the operative face of the crown portion, a face of the main body portion contacting with the wall, when the portions are secured to one another, to provide a generally-spiral passage through which lubricant under pressure can be circulated for cooling purposes.

3. A piston, according to Claim 2, in which the crown portion has a ring-carrying flange which fits round the adjacent end of the main body portion.

4. A piston, according to any preceding claim, of which the outlet for the lubricant is on the piston axis.

5. The complete piston substantially as hereinbefore described with reference to the accompanying drawings.

Dated this 20th day of June, 1939.
WALFORD & HARDMAN BROWN,
Chartered Patent Agent,
Roslyn Chambers,
47, Warwick Road, Coventry,
Warwickshire.

[This Drawing is a reproduction of the Original on a reduced scale.]

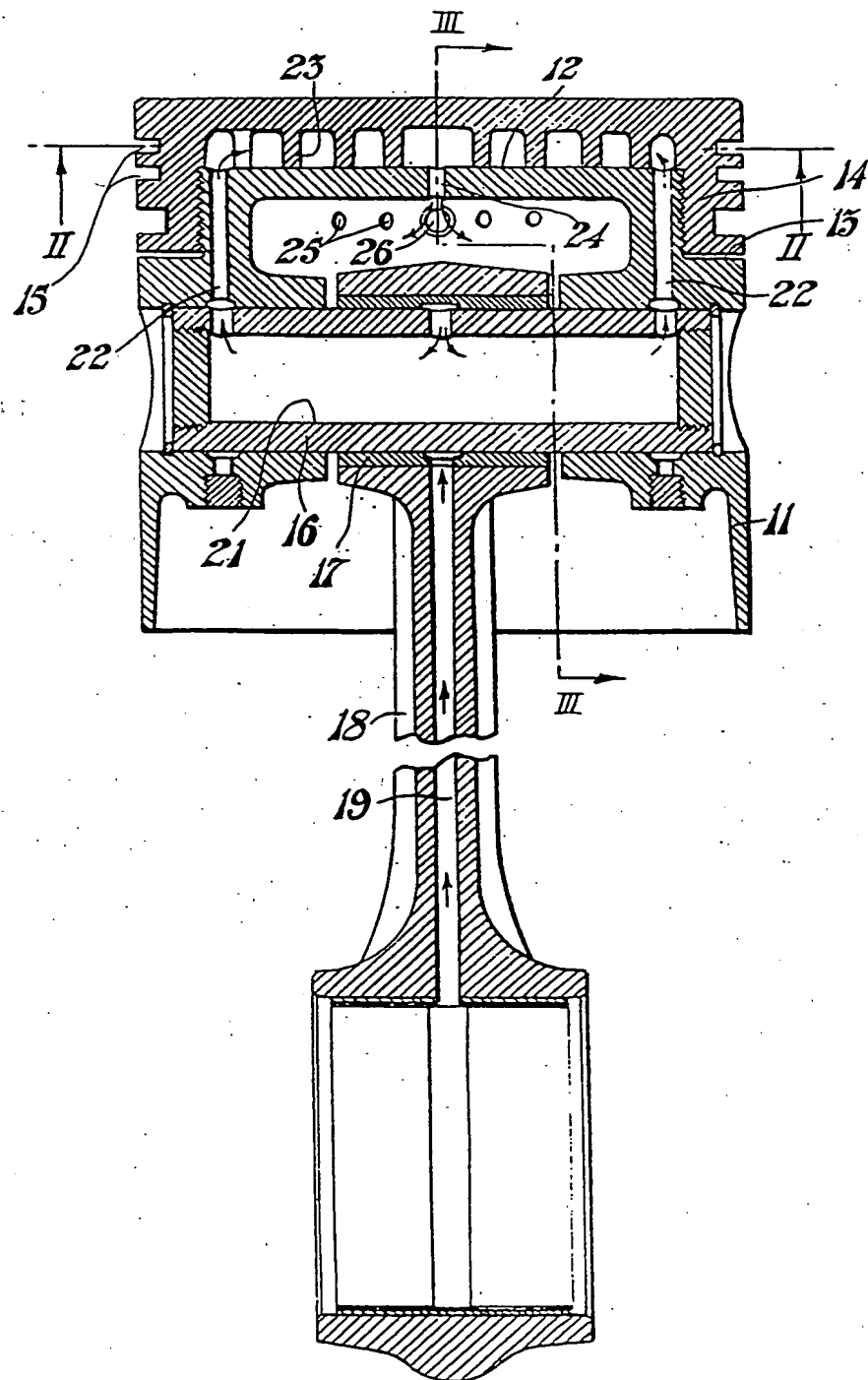


Fig. 1.

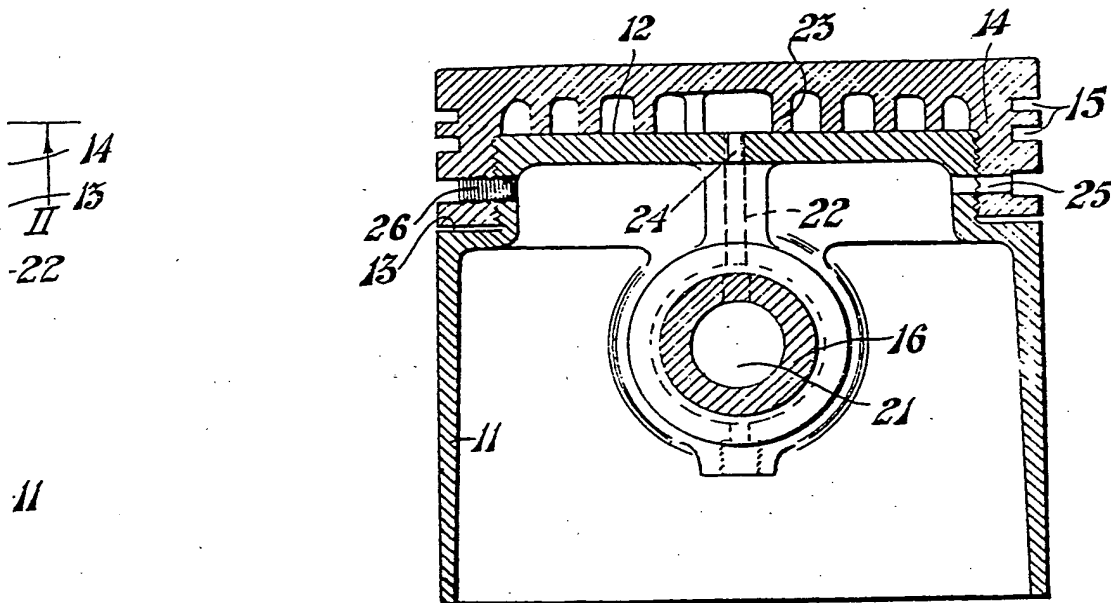


Fig. 3.

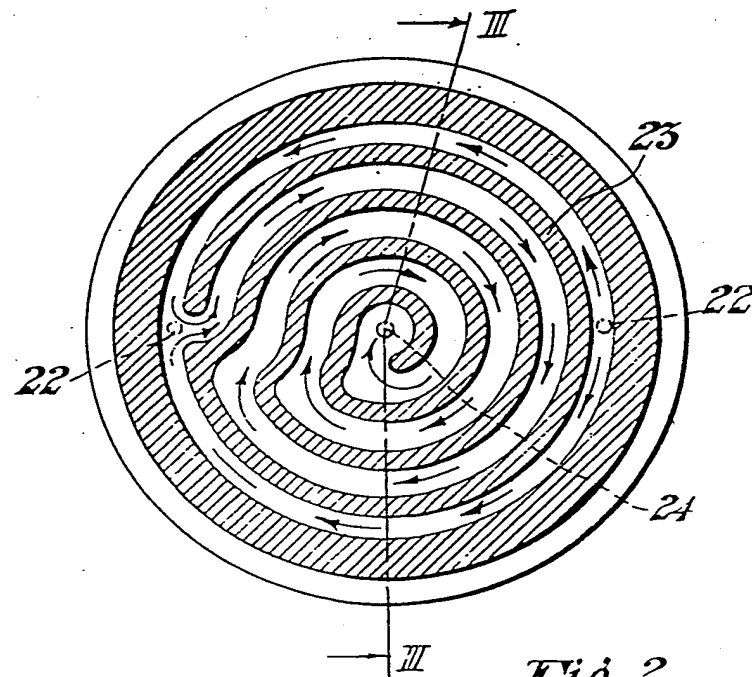


Fig. 2.

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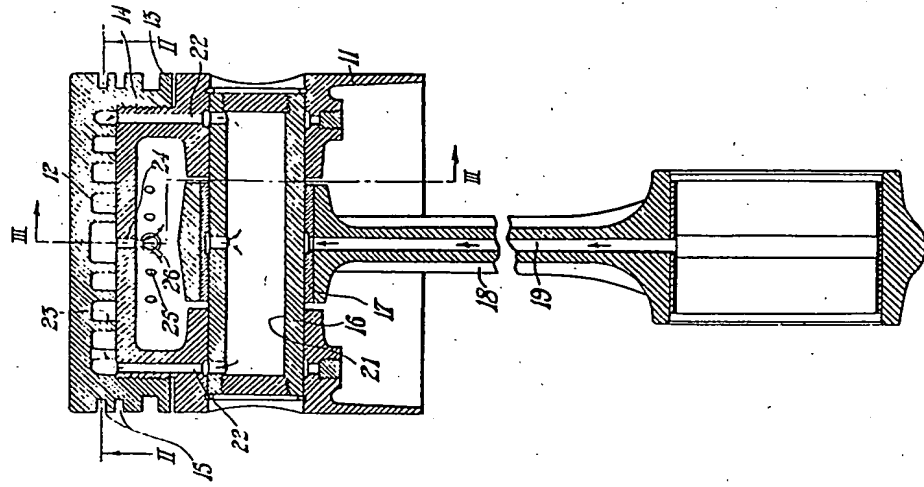


Fig. 1.

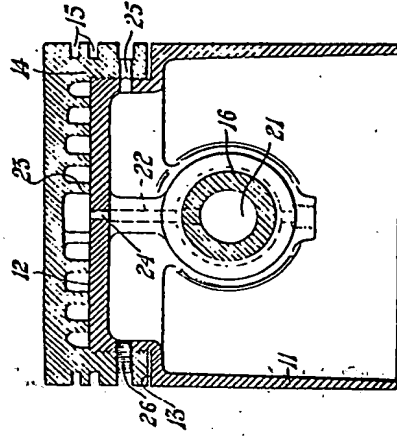


Fig. 3.

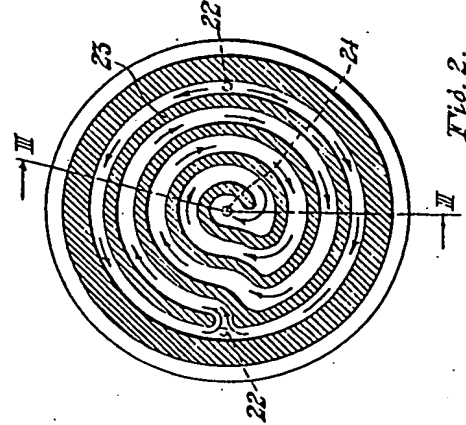


Fig. 2.

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